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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/653,829	Applicant(s) CULLICK ET AL.	
	Examiner Cuong V. Luu	Art Unit 2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 04 January 2010.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,7,9,10,13,15-21,23-25,27-31,42,45 and 48-56 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,7,9,10,13,15-21,23-25,27-31,42,45 and 48-56 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/4/2010 has been entered.

DETAILED ACTION

The Examiner would like to thank the Applicant for the well-presented response, which was useful in the examination. The Examiner appreciates the Applicant's the effort to perform a careful analysis and make appropriate amendments to the claims.

Claims 1, 7, 9-10, 13, 15-21, 23-25, 27-31, 42, 45, and 48-56 are pending. Claims 2-6, 8, 11-12, 14, 22, 26, 31-41, 43-44, and 46-47 have been canceled. Claim 54-56 has been added. Claims 1, 7, 9-10, 13, 15-21, 23-25, 27-31, 42, 45, and 48-56 have been examined. Claims 1, 7, 9-10, 13, 15-21, 23-25, 27-31, 42, 45, and 48-56 have been rejected.

Response to Arguments

1. The objections of claims 51 and 52 have been withdrawn in light of it amendments.

1. Applicant's arguments with respect to claims 1, 7, 9-10, 13, 15-21, 23-25, 27-31, 42, 45, and 49-56 have been considered but are moot in view of the new ground(s) of rejection under U.S.C. 103(a).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 13, 16, 49, 51-52, and 54-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicants' Admitted Prior Art (pp. 1-3 of the instant application's specification), hereinafter AAPA, in view of Gorell et al. (Trends in Reservoir Simulation: Big Models Scalable Models? Will you Please Make up Your Mind?, SPE 71596, SPE Annual Technical Conference and Exhibition, 9/2001), and Netemeyer et al. (U.S. Pub. 2002/0169785 A1).

2. As per claim 1, AAPA teaches a method comprising:

a computer system receiving user input selecting one or more simulation engines corresponding to a value chain (p. 2 paragraph 4. In this paragraph the AAPA teaches executing a simulation engine to run a simulation based on model which is built on parameters. A simulation starts by a user's command, and a simulation model is built on parameters, which are regarded as a value chain. Therefore, AAPA's teachings read onto this limitation);

the computer system assembling a model in a memory that represent components of a value chain, wherein the models includes one or more variables,

the computer system assembling the instantiated model into a workflow (p. 2 paragraphs 4-5. In these paragraphs AAPA teaches planning the production with reservoir simulation and economic computation. This teaching reads onto this limitation);

the computer system executing simulation engines on the workflow to generate data output, wherein the simulation engines include one or more physics-based flow simulators for simulating reservoirs and wells, wherein the simulation engines also include an economic computation engine (p. 2 last 2 paragraphs);

the computer system storing the selected values of the variables and the data output from the one or more simulation engines to a memory (p. 2 paragraphs 3-4. In this paragraphs the AAPA teaches computing revenue based on oil production, which is obtained from reservoir simulation. This teaching indicates that outputs from reservoir simulation are stored for later use, so it reads onto this limitation);

but does not teach following limitations that either Gorell or Netemeyer teaches:

the computer system assembling a set of models wherein each of the models of said set includes one or more variables, where each of said one or more variables is defined on a corresponding range (Gorell, p. 9 col. 2 section Economic Monte Carlo Simulation. In this

section Gorell teaches running Monte Carlo simulation. Monte Carlo simulation inherently varies values of variables within selected ranges in one or more models and run simulation. This teaching, therefore, reads onto this feature), wherein at least one of the models of said set of models is a high-resolution geocellular reservoir model (Gorell, p.2 col. 1 paragraph 4 and p.5 col. 1 paragraph 3 and p. 5 Table 2. In these cited paragraphs and Table, Gorell teaches using geocellular reservoir model with number of cells of maybe 125000. These teachings read onto a high-resolution geocellular reservoir model);

the computer system selecting values of the variables in their respective ranges to create instantiated models (Gorell, p. 6 col. 2 last paragraph);

the computer repeatedly performing said selecting, said assembling the instantiated models, said executing and said storing (Gorell, p. 1 col. 1 last paragraph though 2nd paragraph from bottom in col. 2. In these lines, Gorell teaches simulating various models based parameters spanning uncertainties that may affect reservoir recovery. This teaching indicates that there are iterations in the simulating procedure, so it reads onto this limitation);

the one or more simulation engines include including one or more physics-based reservoir flow simulators for simulating reservoir, wells (Gorell, pp. 5-6 section Identify Parameters through 1st Iteration);

simulating surface-pipeline hydraulics (Netemeyer, p. 1 paragraphs 0002, 0005).

It would have been obvious to one of ordinary skill in the art to combine the teachings of the AAPA, Gorell and Netemeyer. Gorell's and Netemeyer's teachings would have provided been useful in simulating a reservoir system that extends the discretized reservoir simulation model beyond reservoir to include nodes and connection for modeling fluid flow in the well tubulars and surface production and gathering lines, separators and pipelines (Netemeyer,

p. 2 paragraph 0025) and characterized these workflows because the results are ranges or distributions of outcomes (Gorell, p. 1 col. 2 last 2 lines in 2nd paragraph from bottom).

3. As per claim 13, the AAPA, Gorell, and Netemeyer in combination teach:

a computer system computing an instantiated value of each random variable in a set of random variables (already discussed in claim 1);

the computer system selecting a first geocellular reservoir model from a collection of high-resolution geocellular reservoir models based on a first subset of the instantiated values (already discussed in claim 1);

the computer system resolving uncertain dates for events in one or more schedules using a second subset of the instantiated values in order to determine resolved event dates in the one or more schedules (the AAPA on p. 2 last paragraph teaches using economic computation engine to schedule specifying dates and production profiles of oil, gas, and water predicted by the reservoir simulation. Gorell, on p. 1 col. 1 last paragraph though 2nd paragraph from bottom in col. 2 and p. 4 col. 1 paragraph 3, teaches simulating various models based parameters spanning uncertainties that may affect reservoir recovery to reduce the uncertainty in the outcome. The simulation spanning uncertainties in the production of gas and oil to reduce the uncertainty in the outcome in combination with the AAPA's teaching of schedule specifying dates imply resolution of event dates in the one or more schedules);

the computer system executing a simulation engine on an input data set including the first geocellular reservoir model and the resolved event dates, wherein the simulation engine includes one or more physics-based flow simulators for simulating reservoirs, wells and

surface-pipeline hydraulics, wherein the simulation engine also includes an economic simulator (already discussed in claim 1); and

the computer system capturing data generated by the simulation engine in response to said execution to a storage medium (already discussed in claim 1);

the computer system repeatedly performing a set of operations, wherein the set of operations includes said computing, said selecting, said resolving, said executing and said capturing (already discussed in claim 1).

It would have been obvious to one of ordinary skill in the art to combine the teachings of the AAPA, Gorell and Netemeyer. Gorell's and Netemeyer's teachings would have provided been useful in simulating a reservoir system that extends the discretized reservoir simulation model beyond reservoir to include nodes and connection for modeling fluid flow in the well tubulars and surface production and gathering lines, separators and pipelines (Netemeyer, p. 2 paragraph 0025) and characterized these workflows because the results are ranges or distributions of outcomes (Gorell, p. 1 col. 2 last 2 lines in 2nd paragraph from bottom).

4. As per claim 16, Gorell teaches the input data set also includes a model of reservoir physical characteristics (pp. 5-6 section Identify Parameters. Several bullets in this section describe physical parameters for modeling a reservoir).

5. As per claim 49, the AAPA teaches the data-output is useable to estimate an economic value of one ore more of the reservoir, wells, and surface-pipeline (p. 2 last paragraph).

6. As per claim 51, Gorell teaches said repeatedly performing covers all possible combinations of values of the variables in their respective ranges (p. 6 the paragraph immediately before section 2nd Iteration).

7. As per claim 52, Gorell teaches said repeatedly performing uses an experimental design algorithm to generate combinations of variable values in each iteration of said repeating (p. 4 col. 2 section Prototyping).

8. As per claim 54, the AAPA teaches the set of models includes a tax model, a royalty model, a capital expenditure model and an operating expenditure model (p. 2 paragraphs 3 and 5).

9. As per claim 55, the AAPA teaches the set of models includes a facility model, wherein the facility model specifies a set of objects including wells, platforms, pipelines and processing plants, wherein the facility model also specifies interconnections between objects of said set of objects, wherein the facility model specifies constraints on production rates and pressure for each of the objects in said set of objects (p. 2 paragraphs 2-5).

Claim 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the AAPA in view of Gorell et al. and Netemeyer et al. as applied to claim 1 above and further in view of Voit et al. (Random Number Generation from Right-Skewed Symmetric, and Left-Skewed Distributions, 0272-4332/00/200-0059, 2000 Society for Risk Analysis).

10. As per claim 7, the AAPA, Gorell and Netemeyer do not teach said selecting of values of the variables includes computing quantiles of one or more user-specified probability

distributions. However, Voit teaches computing quantiles of one or more user-specified probability distributions (p. 61 col. 2 section 3. S-Distribution in Monte Carlo Simulation paragraph 1).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Gorell, Netemeyer and Voit. Voit's teachings would have provided access to uniformly distributed random numbers of sufficient quantity (p. 61 col. 2 section 3. S-Distribution in Monte Carlo Simulation paragraph 1).

11. As per claim 9, the AAPA, Gorell, and Netemeyer do not teach said selecting of values of the variables includes choosing a value in a user-specified quantile range [Q_A, Q_B] based on a probability distribution specified by a user for a first one of the variables, wherein A and B are integers between zero and 100 inclusive.

However, Voit teaches this limitation (p. 62 col. 2 section 4. Error Estimation paragraphs 1-2. In these paragraphs Voit teaches estimation errors in quatiles between 1st and 99th and then an example of selecting a value for h and g parameters in the 98th quantile. The teaching of estimating errors in specified quantiles indicates the intention to select values of parameters in those quantiles, Illustrated in the example. Therefore, this teaching reads onto this limitation).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Gorell, Netemeyer and Voit. Voit's teachings would have provided access to uniformly distributed random numbers of sufficient quantity (p. 61 col. 2 section 3. S-Distribution in Monte Carlo Simulation paragraph 1).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over the AAPA in view of Gorell et al. Netemeyer et al. and Voit et al.

12. As per claim 10, these limitations have already been discussed in claims 1 and 7. They are, therefore, rejected for the same reasons.

Claims 17-21, 27-28, 30, 42, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over the AAPA in view of Gorell, Netemeyer et al. (U.S. Pub. 2002/0169785 A1), and Jalali et al. (U.S. Pub. 2002/0177955 A1).

13. As per claim 17, the AAPA, Gorell and Netemeyer in combination teach a system comprising:

a memory storing program instructions and data (already discussed in claim 1);

a processor configured to read the program instructions from the memory, wherein the program instructions are executable by the processor (the AAPA teaches simulation of reservoir model and use of Excel for an economic engine computation. This teaching implies a computer and reads onto this limitation), the processor is operable to:

assemble a set of models, wherein each of the models of said set includes one or more variables, where each of said one or more variables is defined on a corresponding range, wherein at least one of the models of said set of models is a high-resolution geocellular reservoir model (already discussed in claim 1);

select values of the variables in their respective ranges to create instantiated models (already discussed in claim 1);

assemble the instantiated models into a workflow (already discussed in claim 1); and

execute a plurality of simulation engines on the workflow, wherein he simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engines also include an economic computation engine (already discussed in claim 1);

repeatedly perform a set of operations, wherein the set of operations includes said selecting, said assembling the instantiated models and the perforation locations, and said executing the simulation engines (already discussed in claim 1);

but does not teach:

execute a well-perforator program on one or more well plans included in the instantiated models in order to determine perforation locations for the one or more well plans.

Jalali teaches execute a well-perforator program on one or more well plans included in the instantiated models in order to determine perforation locations for the one or more well plans (p. 9 paragraphs 0107-0108).

It would have been obvious to one of ordinary skill in the art to combine the teachings of the AAPA, Gorell, Jalali, and Netemeyer. Gorell's, Netemeyer's and Jalali's teachings would have been useful in simulating a reservoir system that extends the discretized reservoir simulation model beyond reservoir to include nodes and connection for modeling fluid flow in the well tubulars and surface production and gathering lines, separators and pipelines (Netemeyer, p. 2 paragraph 0025) and determined locations of perforation if needed (Jalali, p. 9 paragraph 0107) and characterized these workflows because the results are ranges or distributions of outcomes (Gorell, p. 1 col. 2 last 2 lines in 2nd paragraph from bottom).

14. As per claim 18, the AAPA teaches storing data output from the one or more simulation engines to the memory (already discussed in claim 1).

15. As per claim 19, these limitations have already been discussed in claim 17. They are, therefore, rejected for the same reasons.

16. As per claim 20, these limitations have already been discussed in claim 18. They are, therefore, rejected for the same reasons.

17. As per claim 21, these limitations have already been discussed in claims 17 and 18. They are, therefore, rejected for the same reasons.

18. As per claim 27, Gorell teaches said performing setup operations including receiving user input specifying execution qualifying data corresponding to the case, wherein the execution qualifying data includes a set of attainable values for each planning variable (p. 9 col. 2 section Economic Monte Carlo Simulation. In this section Gorell teaches running Monte Carlo simulation. Monte Carlo simulation inherently varies values of variables within selected ranges in one or more models and run simulation. This teaching, therefore, reads onto this feature).

19. As per claim 28, Gorell teaches the execution qualifying data includes a number of iterations of the calculation loop (p. 10 col. 1 second bullet).

20. As per claim 30, Gorell teaches the execution qualifying data include data characterizing probability distributions for one or more of the planning variables (p. 8 Figures 11-12. These figures describe the simulation over a range of variable inputs to create complete PDF of

output. It means a range of data input for generation of PDF, probability distribution, so this range of data input to characterize PDF, so it reads onto this limitation).

21. As per claim 42, the AAPA, Gorell, Netemeyer, and Jalali in combination teaches a computer-implemented method comprising:

a computer system receiving user input characterizing probability distributions for planning variables associated with a set of models, wherein the set of models includes one or more high-resolution geocellular reservoir models;

the computer system generating instantiated values of the planning variables (already discussed in claim 17);

the computer system assembling one or more input data sets for one or more a plurality of simulation engines from the set of models and the instantiated values, wherein said assembling includes resolving uncertain event dates in one or more schedules included in the set of models based on a first subset of the instantiated values (the AAPA on p. 2 last paragraph teaches using economic computation engine to schedule specifying dates and production profiles of oil, gas, and water predicted by the reservoir simulation. Gorell, on p. 1 col. 1 last paragraph though 2nd paragraph from bottom in col. 2 and p. 4 col. 1 paragraph 3, teaches simulating various models based parameters spanning uncertainties that may affect reservoir recovery to reduce the uncertainty in the outcome. The simulation spanning uncertainties in the production of gas and oil to reduce the uncertainty in the outcome in combination with the AAPA's teaching of schedule specifying dates imply resolution of event dates in the one or more schedules);

the computer system executing a well perforator program based on a second subset of the set of models and a second subset of the instantiated values (already discussed in claim 17);

the computer system executing the one or more simulation engines on the one or more input data sets, wherein the simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engines also include an economic computation engine (already discussed in claim 17);

the computer system storing the instantiated values of the planning variables and data output from the one or more simulation engines to a storage medium (already discussed in claim 17); and

the computer system repeatedly performing a set of operations, wherein the set of operations includes said generating, said assembling, said executing a well perforator, said executing the one or more simulation engines, and said storing until a termination condition is achieved (already discussed in claim 17).

It would have been obvious to one of ordinary skill in the art to combine the teachings of the AAPA, Gorell, Jalali, and Netemeyer. Gorell's, Netemeyer's and Jalali's teachings would have been useful in simulating a reservoir system that extends the discretized reservoir simulation model beyond reservoir to include nodes and connection for modeling fluid flow in the well tubulars and surface production and gathering lines, separators and pipelines (Netemeyer, p. 2 paragraph 0025) and determined locations of perforation if needed (Jalali, p. 9 paragraph 0107) and characterized these workflows because the results are ranges or distributions of outcomes (Gorell, p. 1 col. 2 last 2 lines in 2nd paragraph from bottom).

22. As per claim 45, Gorell teaches executing a reservoir model-scaling engine to scale one or more high-resolution geocellular reservoir models of said set of models to a lower resolution (p. 5 col. 1 section Upscaling and Validation).

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over the AAPA in view of Gorell, Netemeyer, and Jalali as applied to claim 21 above, and further in view of Begg (Improving Investment Decision Using a Stochastic Integrated Asset Model, SPE 71414, SPE Annual Technical Conference and Exhibition, 9/2001) submitted by the Applicant in IDS.

23. As per claim 23, the AAPA, Gorell, Netemeyer, and Jalali do not teach said storing the instantiated planning variables and simulation output data onto the storage medium in a relational database format. However, Begg teaches storing data in a relational database format (p. 5 col. 1 paragraph 3).

It would have been obvious to one of ordinary skill in the art to combine the teachings of the AAPA, Gorell, Jalali, Netemeyer, and Begg. Begg's teachings would have supported efficient exploration by data analysis tools (p. 5 col. 1 paragraph 3).

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over the AAPA in view of Gorell, Netemeyer, and Jalali as applied to claim 21 above, and further in view of Voit et al.

24. As per claim 24, Gorell teaches said generating instantiations of the planning variables includes:

calculating a set of random numbers (p. 9 col. 2 section Economic Monte Carlo Simulation. In this section Gorell teaches running Monte Carlo simulation. Monte Carlo simulation inherently varies values of variables within selected ranges in one or more models and run simulation. This teaching suggests random variables),

but does not teach calculating quantile values using the random numbers and user-defined probability distributions associated with the planning variables.

Voit teaches computing this limitation (p. 61 col. 2 section 3. S-Distribution in Monte Carlo Simulation paragraph 1).

It would have been obvious to one of ordinary skill in the art to combine the teachings of the AAPA, Gorell, Netemeyer, Jalali, and Voit. Voit's teachings would have provided access to uniformly distributed random numbers of sufficient quantity (p. 61 col. 2 section 3. S-Distribution in Monte Carlo Simulation paragraph 1).

Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over the AAPA in view of Gorell, Netemeyer, Jalali, and Begg et al.

25. As per claim 48, Gorell teaches:

a computer system receiving user input characterizing a set of planning variables associated with a set of models (p. 2 col. 2 first 3 bullets);

the computer system generating instantiated values of the planning variables (p. 6 col. 2 last paragraph);

the computer system assembling a first input data set using a first subset of the instantiated values and a first subset of the set of models (p. 5 section Upscaling and Validation), and assembling a second input data set using a second subset of the

instantiated values and a second subset of the set of models (p. 5 section Upscaling and Validation and p. 4 col. 2 second bullet), wherein the first subset of the set of models includes a high-resolution geocellular reservoir model (p.2 col. 1 paragraph 4 and p.5 col. 1 paragraph 3 and p. 5 Table 2);

the computer system executing one or more physics-based flow simulators on the first input data set to generate flow data for oil, gas and water (p. 2 col. 1 paragraph 4 and p. 5 col. 1 last paragraph through p.5 first paragraph) wherein the one or more physics-based flow simulators are configured to simulate reservoirs, wells (pp. 5-6 section Identify Parameters through 1st Iteration);

executing an economic computation engine on the second input data set to generate economic output data (p. 10 col. 1 paragraph 1);

storing the instantiated values of the planning variables, the flow data and the economic output data to a storage medium (p. 3 col. 2 last paragraph); and

repeating steps until a termination condition is achieved (p. 10 col. 1 second bullet).

Gorell does not teach:

storing data in a relational database format;

appending the flow data to the second input data set (p. 5 col. 1 paragraph 2 and col. 2 section Generating Simple Surrogates)

the computer system determining instantiated schedules using a third subset of the instantiated values and a third subset of the models, and appending the instantiated schedules to the first input data set and the second input data set;

executing a well-perforator program to determine well perforation locations for wells in the first input data set, and appending the well perforation locations to the first input data set;

the one or more physics-based flow simulators are configured to simulate surface-pipeline hydraulics;

Jalali teaches limitation executing a well-perforator program to determine well perforation locations for wells in the first input data set, and appending the well perforation locations to the first input data set (p. 9 paragraphs 0107-0108);

Begg teaches:

storing data in a relational database format (p. 5 col. 1 paragraph 3);

appending the flow data to the second input data set (p. 5 col. 1 paragraph 2 and col. 2 section Generating Simple Surrogates);

the computer system determining instantiated schedules using a third subset of the instantiated values and a third subset of the models, and appending the instantiated schedules to the first input data set and the second input data set (p. 5 col. 1 paragraph 2. In this paragraph Begg teaches using a model to calibrate the SIAM component models, estimate uncertainty in their input parameters. This teaching reads onto this limitation);

Netemeyer teaches at least one of the one or more simulations engines including one or more physics-based reservoir flow simulators for simulating surface-pipeline hydraulics (p. 1 paragraphs 0002, 0005).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Gorell, Beggs, Jalali, and Netemeyer. Netemeyer's and Jalali's teachings would have been useful in simulating a reservoir system that extends the discretized reservoir simulation model beyond reservoir to include nodes and connection for modeling fluid flow in the well tubulars and surface production and gathering lines, separators and pipelines (Netemeyer, p. 2 paragraph 0025) and determined optimum segmentation for the well (Jalali, p. 9

paragraph 0107) and calibrated component models (Begg, p. 5 col. 1 paragraph 2 to improve the fidelity of the models representing the real world).

Claims 50 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over the AAPA in view of Gorell and Netemeyer as applied to claims 1 and 13 above, and further in view of Joshi et al. (Techno—Economic and Risk Evaluation of a Thermal Recovery Project, March 1996, Prepared for Department of Energy, Under Contract DE-FG22-93BC14899).

26. As per claim 50, Gorell and Netemeyer do not teach selecting of values of the variables is based on a Latin Hypercube sampling of the variables. However, Joshi teaches this limitation (pp. xliv, paragraph 4; p. xlv, paragraph 2).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Gorell, Netemeyer, and Joshi. Joshi's teachings would have accurately re-created an input distribution in less iteration, as compared to Monte-Carlo sampling (Joshi, paragraph 4; p. xlv, paragraph 2).

27. As per claim 53, this limitation has already been discussed in claim 50. It is, therefore, rejected for the same reasons.

Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over the AAPA in view of Gorell and Netemeyer as applied to claim 1 above, and further in view of Begg.

28. As per claim 56, the AAPA, Gorell, and Netemeyer do not teach the set of models includes a hierarchical tree of models, wherein at least one of the instantiated models is a leaf of the hierarchical tree, wherein two or more of said selected values specify a path from a root of the hierarchical tree to the leaf of the hierarchical tree.

However, Begg teaches this limitation (p. 7 col. 1 paragraph 2).

It would have been obvious to one of ordinary skill in the art to combine the teachings of the AAPA, Gorell, Netemeyer, and Begg. Begg's teachings would have provided a hierarchy of decisions (p. 7 col. 1 paragraph 2).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cuong V. Luu whose telephone number is 571-272-8572. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah, can be reached on 571-272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. An inquiry of a general nature or relating to the status of this application should be directed to the TC2100 Group receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Cuong V Luu/

Examiner, Art Unit 2128

/Hugh Jones/

Primary Examiner, Art Unit 2128